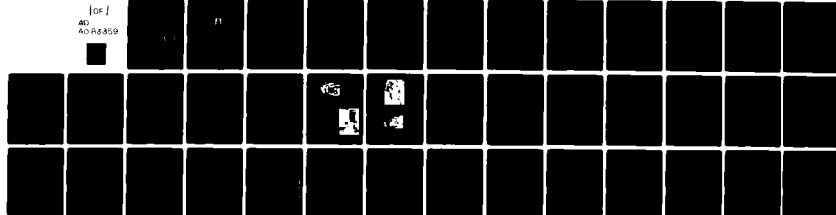


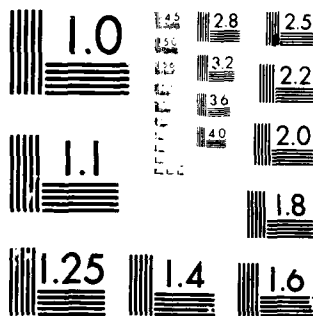
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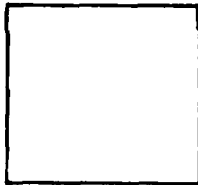


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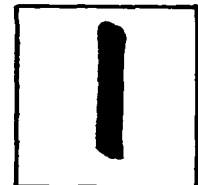
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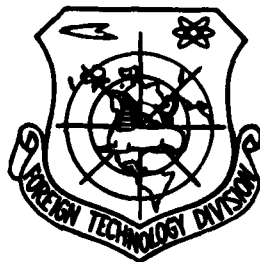
FOREIGN TECHNOLOGY DIVISION



HARDWARE ELEMENTS OF THE UNIFIED SYSTEM OF
DIGITAL COMPUTERS PERIPHERAL DEVICES OF THE
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by

J. Pelc, J. Sobaniec, F. Swiderski



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EDITED TRANSLATION

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Hardware Elements of the Unified System of Digital Computers

Peripheral Devices of the Unified System

by

J. Pelc, J. Sobaniec, F. Swiderski

Abstract: The technical data on the peripheral devices exhibited on the Unified System of Digital Computers (USDC) Exhibition in Moscow during May-June 1973 are presented. Described are the magnetic tape, drum and disc storage systems and the I/O devices.

In the program of the Unified System of Digital Computers the great attention was given to the production of wide assortment of peripheral devices, and in particular: drum, disc and magnetic tape storages, punched cards and paper tape I/O devices, X-Y plotters, printers and the direct interface of operator with the machine. On the USDC Exhibition in Moscow, held in May-June 1973, this type of equipment was shown, developed and produced by the cooperating countries.

External Storage

Magnetic Tape

The magnetic tape storage is a group of peripherals with large storage capacity. Its characteristics is a relatively large average access time due to the sequential access principle. The magnetic tape storage interfaces with the machine through an appropriate controller unit connected to the selector channel.

The majority of the countries cooperating in the USDC, manufactures similar Tape units. Poland manufactures the EC-5019 (PT-3) tape storage in Warsaw

EDP Works MERAMAT.

The selected technical data on the USDC magnetic tape storage are given in Table 1. Subclassification of these units is made according to the following parameters:

- maximum rate of information flow
- writing density
- tape speed.

The analysis of the basic technical data indicates that the following devices have the best parameters: EC- 5014, EC- 5019 and EC-5022. All the devices have basically the writing density of 8 and 32B/mm (200 and 600 bpi) except for the EC - 5014 which has the writing density of 63 b/mm (1600 bpi).

The slowest is the EC - 5016 tape storage. The parameters of the remaining tape storage systems of USDC do not differ significantly. All the devices use the medium with the identical parameters.

Drum Storage

The drum memory is the group of peripherals based on rotating magnetic medium. One has to add, that this type of auxiliary storage, despite its high data transfer rate and short access time due to the random addressing, is becoming obsolete with the exception of specialized machines,

The drum memories within the USDC are manufactured in USSR and Poland. The subclassification of these memories is done according to the following criteria:

- storage capacity
- average access time
- maximum data transfer rate.

Table 3 compares the drum memories of the USSR make (EC-5033) and Polish (EC-5035) from the point of view of parameters in Table 2.

Disc Memory

The magnetic disc memory combine the advantages of magnetic tape (large capacity, portability of media) and the drum memories (direct addressing, rapid access). They can be interfaced to the machine through the special controller units, which are rather complex, and the cost of which most often exceeds the cost of single disc drive.

Among the disc units one can single out two basic groups: units with removable media and fixed medium discs. Each of the groups can then be classified according to their capacities.

The disc memories shown on the USDC Exhibition have small capacities. The Bulgarian booth was showing the removable disc packets designated EC-5053 corresponding to the IBM model 321 and Memorex model 630.

The selected technical data for the discs with the removable media are shown in Table 4, and for the fixed media in Table 5. The data for EC-5053 disc pack are given below:

capacity of the pack - 7.25 Mbytes

maximum speed- 2500 rpm

maximum number of tracks on one surface - 203

number of surfaces- 10

operating temperature - 5 to 10° C

humidity - 10 - 80%

weight - 4400 g

height - 105 mm

width - 378 mm

The EC - 5053 disc pack can be used with the EC -5052 discs.

Punched Card Based I/O devices

Punched Readers

The exhibited USSR manufactured readers, EC-6012, and EC - 6013, are designed to read the information from the 45 and 80 column punched cards.

The reading takes place on column-by column base in two modes:

- reading of data in standard 12 row code KPK-12 and converting it into OKOI code on output,
- reading any code without conversion.

The reading mode is set by a program. The device checks the read information for the illegal combination of holes, checks the readiness of reading and synchronization channels before feeding the card, checks for mis-feed or double feed of card, and controls the synchronization system at the end of the card reading cycle. The units contain the operator's console with the control buttons and signalization lights. The control buttons allow for the following commands: START, STOP, EOF, FEED. The signalization lights indicate the errors as found by the control systems.

The basic difference between the EC-6012 and the EC-6013 readers is in the twice as high reading speed of the latter. Both devices can be connected to the multiplex or selector channel of any USOC machine, only the EC-6016 machine requires a special adapter.

The Czechoslovakian booth exhibited the EC-6016 reader (ARITMA 1114) similar to the Soviet EC-6013 reader.

All these devices operate in the start-stop mode, with the photoelectric reader. They are built using the integrated circuits and discrete components. The basic technical data for the card readers are given in Table 6.

Card Punch

The card punches are used to output the information from the computer

in the form of electrical impulses into 80 column punched paper cards. The EC- 7010 and EC- 7012 devices manufactured in the USSR can be connected to any USDC through the multiplex channel. The information from the channel is stored in a buffer equal to one card size and then punched out on the card. The punching takes place in all 12 positions, with the 0.7 fill coefficient. The information can be punched out with conversion on to standard KPK -12 code, or any other code without conversion. The mode of operation is set by the program.

The EC-7010 punch checks out the punched information by the readout and comparison with the buffer content, and the EC-7012 punch by comparison of the buffer content and the echo signal from the punching mechanism. The EC -7012 punch is five times as fast as EC-7010.

Czechoslovakia manufactures two types of card punch designated as EC-7013 and EC-7014. EC-7013 is similar in its performance to the EC-7012. The check of the punched out information takes place by a comparison of the photoelectric reader output and the buffer memory. The card is then diverted to one of two bins. The bins can be filled or emptied without interrupting the punch operation.

The EC-7014 card punch is about half as fast as EC-7012, but here the punching speed depends on the number of columns to be punched, and increases for the smaller number of columns. The checking and rejection of misspunched card is similar as in EC-7013.

The basic parameters and characteristics of these devices are given in Table 7.

Punched Paper Tape and Edge-punched card I/O Devices

Another group of I/O devices shown at the Exhibition are the devices which use the paper tape as an information medium. This group includes: the

controller of punched paper tape reader designated as EC-6022 and manufactured by Poland, USSR and Hungary, paper tape punch controllers EC-7024 manufactured by Poland and EC-7022 manufactured by the USSR. Another variant is a paper tape reader punch combination controller. These devices are made in Czechoslovakia and East Germany under the designation EC-7902.

The devices described above have built-in channel interfaces and can operate both in the multiplex and selector mode. The basic parameter such as reading or punching speed is limited by the mechanism itself and not by the electronics.

The paper tape units EC-7902, made by East Germany, can be easily connected to another reader without the interface expansion. The described unit used EC-6122 reader and EC-7122 punch, both made in Poland.

The technical data of the paper tape devices are given in Tables 8, 9, 10.

Punched Paper Tape Input Devices (mechanisms)

The paper tape readers are manufactured in Hungary, Poland and Czechoslovakia in two basic groups differing mainly in reading speed. The slow readers EC-6121 have the start-stop mode speed from 150 to 300 char/s, and the fast devices, EC-6122, read with the speeds of 1000-2000 char/s. These devices are designed to work with the USDC through the appropriate controllers. In addition, they can be used as one of the I/O channel devices of the control device for the numerical control machines. All the devices work in the start-stop mode with the photoelectric readout of 5 and 8 track tape. The basic reliability data are as follows:

- average time between failures: 400-500 hours
- error rate: $1 - 5 \times 10^{-7}$
- availability factor: 0.975

The basic technical data for paper tape readers are given in Table 11.

Paper Tape and Edge-punched Card Input Devices (mechanisms)

The EC-6191 devices, are manufactured by Hungary and Czechoslovakia read information from 5 and 6 track paper tape and edge punched cards. These devices are rather slow, with the bidirectional reading capability. They are driven by a stepper motor. The readout is photoelectric.

These devices can be used for:

- device for slow data transmission,
- data preparation device,
- numerical control machine readout device,
- process control devices, etc.

The EC-6111 device differs from the EC-6191 only that it reads 80 column cards. The basic parameters are given in Table 12.

Devices to output the information on paper tape and edge punched cards (mechanisms)

The EC-7191 devices made in Hungary and EC-7192 made in Czechoslovakia, are used to write the information on the edge punched cards and on the paper tape with 5 and 6 tracks in 5, 6, 7 and 8 bit code. The devices have the bidirectional feed capability.

The EC-7191 device has the option of echo-control allowing for the comparison of output and punched information. The EC-7192 device has this option already built-in. The devices can be used for slow data transmission and for the data preparation, or they can be used as I/O devices for small computers and automated production control. The basic parameters are given in Table 13.

Paper Tape Punch

The EC-7122 paper tape punch made in Poland converts the electrical impulses into the appropriate combination of holes on the paper tape. The punching speed is 110 char/s. The information can be punched on 5 or 8 tracks. The punch can be used as an output device for the computer, or in data transmission channels. The electronics is based on the integrated circuits. The basic technical parameters of EC-7122 punch are given below:

- punching speed - 110 char/sec
- width of 5 track tape - 17.46 ± 0.05 mm
- width of 8 track tape - 25.4 ± 0.05 mm
- tape thickness - 0.1 ± 0.006 mm
- maximum reel diameter - 203 mm
- punching time for 1 reel - about 20 min.
- power supply - 220V, 50 Hz
- power consumption - 200 VA
- dimensions - 380 X 280 X 170 mm
- weight - 21 kg

The device similar to the above, designated as EC-7121, punching 5 and 8 track tape with the speed of 150 char/sec is made in the USSR.

X-Y Plotters

The X-Y plotters are the devices for the automatic drawing of lines and symbols on the paper sheets or reels using the data obtained from the computer paper tape readers, or magnetic storage systems.

USSR exhibited two drum type devices: EC-7052 and EC-7053. Each device contained: control system data preparation system and the X-Y writing unit. The control in the Y direction takes place by the drum rotation, and in the X direction by the pen motion. It is possible to move in both

directions simultaneously. The smallest pen step is 0.1 and 0.5 mm, and all the symbols can be drawn in three scales: 1:2, 1:1, and 2:1. The devices have the capability of 3 color writing, under the program control. The EC-7052 plotter has a smaller number of symbols and smaller work area as compared with the EC-7053.

The USSR made EC-7051 and Czechoslovakian EC-7054 plotters differ in the design from the above ones, the plotting is done on the flat table. All four devices use the stepping motors for the drive. The differences are mainly in the plotting speed, size of the work area, number of symbols and the type of drawn lines, orientation of symbols and coding of the input information.

The comparative technical data on the X-Y plotters are given in Table 14.

Line Printers

A large group of peripheral devices on the USOC Exhibition consisted of printers, which present the information in the form of a printout. These devices in addition to the printing mechanism are equipped with the control system and the interface allowing for the connection to the USOC channel. The majority of the exhibited printers belonging to the USOC family are the rotating drum type. The data to be printed are stored in the buffer. The control system compares the stored data with the approaching character. In the case of match the hammer is electromagnetically activated, and the character is printed. After the line is printed out, the paper is advanced, using the edge perforation. The paper motion is controlled by the program or using the punched paper tape. The printers can be interfaced to the computer selector or multiplex channel.

To ease the maintenance and repair, the printers are equipped with the testers allowing for the operation test (autonomous mode).

Doubling of the numerals printing speed, in EC-7031 and EC-7035 as compared with other USDC printers, was achieved by doubling the number of these characters on the drum. Printing of the information from the buffer is initiated by the PRINT command. In addition, the EC-7030 and EC- 7032 start the printout as soon as the buffer is full.

The basic technical data and characteristics of printers are given in Table 15.

Devices for the direct communication with the machine Keyboard

The keyboard is designed for the manual entry of data using an appropriately coded signal, and this is the reason why their main application is in the data preparation systems on the magnetic tape, punched cards and paper tape, and as an integral form of display monitors.

The EC-0101 keyboard, made in Hungary and Czechoslovakia, has the advantage of being electronic, contactless and of high reliability. It can also be used in the industrial applications where the high reliability, lack of contact vibration is required, and where the humidity may be high. The contactless keyboard, made in Czechoslovakia allows for the 128 code combinations with the parity bit. Pressing of the same key, depending on the shift key position or the CONTROL key position, produces three different code combinations. The electronic key roll protection is also provided.

The keys are placed in four rows and their designations on the keyboard follows the USDC standard. The output signal levels are the TTL compatible.

The basic technical data for the keyboards are given in Table 16.

Electric Typewriters With the Controllers and the Channel Interface

The electric typewriter with the controller and the channel interface plays the role of the operator's console and provide the direct communication with the machine. The complete device performs the following functions;

- provides the documentation on the executed program
- enters the data necessary for the CPU control,
- outputs the information for the operator,
- displays the information on the machine status.

The typewriter is controlled by the system interfaced directly to I/O channel of USDC. The device can be connected to the selector or multiplex channel. The entire device consists of:

- electric typewriter,
- connecting system
- channel interface
- operator's desk
- power supply
- control system allowing for the control of transferred information, and in the local mode, the control of the entire device.

The following control devices were exhibited:

EC - 7070 (USSR) with the EC- 7172 typewriter

EC - 7071 (Czechoslovakian) with the EC-7172 typewriter

EC- 7073 (E. Germany) with the EC-7173 typewriter

EC-7074 (Bulgaria) with the EC-7174 typewriter

The technical data are given in Table 17.

Typewriters

The typewriters are classified as the group of peripherals allowing the direct interface with the computer, or as the I/O device in the data preparation or accounting systems.

It performs the following functions:

- enters the information to the computer from the keyboard,
- prints out the information from the computer,
- prepares data for the computer.

The energy is provided by the electric motor, which using the driving reel activates the appropriate lever, causing the printout. Special connectors are used to connect it with the control unit. The machine contains key roll protection.

The basic technical data are given in Table 16.

Alphanumeric and Graphic Displays

Alphanumeric and graphic displays serve as a means of a direct interface of man with machine. They are intended to output the information from the computer in alphanumeric or graphic form, and also to enter the information to the computer from the keyboard or light pen.

On input, the text is displayed on the screen, and after verification and correction is transferred to the computer. Also, on the output, the text can be corrected and reentered back.

The basic technical data on the displays are given in Table 19.

Hungary manufactures EC-7061 and EC-7063 alphanumeric displays with the similar parameters. The devices consist of two basic modules, that is, screen monitor with the keyboard, and the operator's desk with the controller. The displays can be interfaced to the standard I/O channels of medium and large computers.

USSR manufactures the alphanumeric display EC-7066 with the parameters

similar to the Hungarian device. The display serves as a portable operator's console and it can be interfaced to the computer through the EC-7566 control unit. Communication between EC-7066 and EC-7566 takes place in the internal code of the EC-7066 device. Entire system of EC-7066 monitors connected to the EC-7566 controller, has the designation of EC-7906. The block diagram is shown in Fig. 4. The maximum number of displays connected to one of the control block branches is 16. The displayed information can have four formats as given below

Number	Format Code	No. of Lines	No. of Characters
1	00	12	80
2	01	6	80
3	10	12	40
4	11	6	40

Depending on a format, the controller can drive four EC-7066 displays with 00 format eight with 01 or 10, or sixteen with 11 format. The format is set manually on a display unit. The maximum size of the displayed data is determined by the capacity of the control system and doesn't exceed 3840 characters.

The displayed data can be printed out using the printer controller and the KONSUL-260 typewriter.

The technical parameter of the EC-7906 system are given below:

- channel connection: standard I/O interface,
- maximum number of simultaneously operating terminals: 4
- total display capacity: 3840 characters,
- maximum length of the interconnecting cable - 500 m
- power supply 380/220V^{+10%} -15%; 50 HZ \pm HZ
- power consumption 1.5 KVA
- dimensions 500 x 1200 x 1190

USSR manufactures the graphic display designated as EC-7064. The full

system consists of the following elements:

- control
- operational memory
- channel interface
- vector generator
- screen display
- keyboard
- power supply
- desk

The EC-7064 display can be connected to the computer through selector or multiplex channel.

An interesting device exhibited by Hungary was the EC - 7065 (GD-71) graphic display. The unit is controlled by a minicomputer and can be connected to a large computer or work as stand -alone, by adding to the minicomputer a magnetic tape or disc storage.

Both configuration require proper control program. A special language and a translator was developed for the EC - 7065, which can be run on any USDC.

The device is especially useful for the following tasks: logic design, printed circuit design, integrated circuit design or to program numerical control machines.



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Fig 1. Polish booth: EC-5019 (PT-3) tape units.



Fig2. Polish booth: paper tape readers.

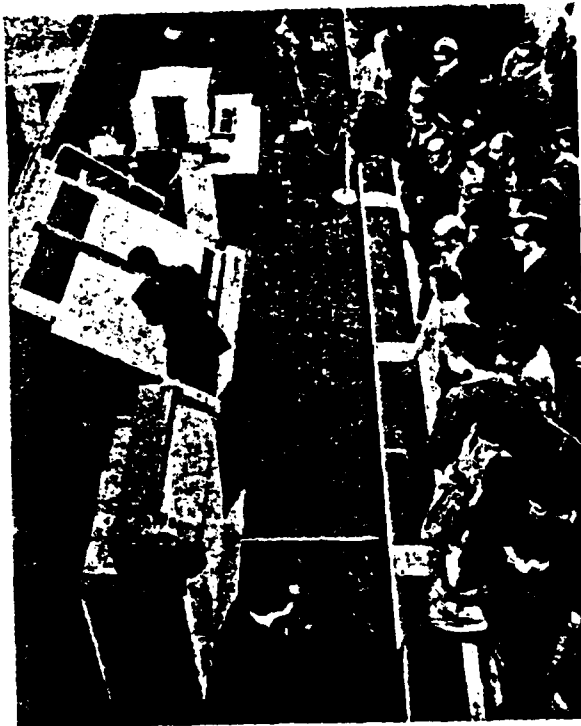


Fig 3. X-Y plotters



Fig 5 USSR booth EC-7064 graphic display.

Table 1. Technical data for USDC magnetic tapes.

1- country, 2- USSR, 3- Bulgaria, 4- E. Germany, 5- Poland, 6- Czechoslovakia, 7- tape units - USDC designation, 8- controller-USDC designation, 9- recording method, 10- access time (seconds), 11-tape speed (m/s), 12- reel rewind time (minutes), 13-no. of tracks, 14-data transfer rate (Kbytes/s), 15-recording density (b/mm) 16- interrecord gap (mm), 17-outside reel diameter (mm), 18-outside container diameter (mm), 19- tape dimensions, 20- max length (mm), 21 - width (mm), 22- EDT sensor, 23- yes, 24- bidirectional reading capability, 25- power supply (V), 26- line frequency, 27- power consumption (KA), 28- weight (kg), 29- dimension (mm).

TECHNICAL DATA FOR USDC MAGNETIC TAPES

① Kraj produkujący	② ZSRR LNU	③ ZSRR	④ NRD	⑤ ZSRR	⑥ PRL	⑦ CSRA
Pamięci taśmowe — oznaczenia w JS EMU	EU-5012	EU-5014	EU-5016	EU-5017	EU-5019	EU-5022
Jednostki sterujące — oznaczenia w JS EMU	EU-5512	EU-5516	EU-5518	EU-5517	EU-5519	EU-5516 EU-5517
Sposób zapisu	NRZ-1	.	NRZ-1	NRZ-1	NRZ	NRZ-1
Czas dostępu [sekundy]	75 (śred.)	75 (śred.)	250	75 (śred.)	100-250	.
Szybkość przesuwu taśmy [m/s]	2	2,0	1,524	2	3	4
Czas przesłania standard. kłaska [minuty]	2,5	2,5	4,2	2,5	2,1	.
Liczba ścieżek	9	9	9	9	9	9
Max szybkość przesyłania informacji [Kbajty/s]	64	128	48	64	120	128
Gęstość zapisu [bit/mm]	8 i 32	64	32	8 i 32	8 i 32	8 i 32
Odstęp między ścieżkami [mm]	12,6-15,7	12,7-15,2	15,2	12,7-15,2	15,2	12,7-15
Zewnętrzna średnica kasety [mm]	267	267	267	267	.	266,7
Zewnętrzna średnica pojemnika [mm]	296	296	.	296	.	.
Wymiary taśmy: Max długość [mm]	750	750	750	750	750	750
Szerokość [m]	12,7	12,7	12,7	12,7	12,7	12,7
Czujnik kodów taśmy	jest	jest	jest	jest	jest	jest
Możliwość czytania w obu kierunkach	jest	jest	jest	jest	jest	jest
Napięcie sieci [V]	220/240	220/240 ⁺¹⁰ -15	220/240 ⁺¹⁰ -15	220/240 ⁺¹⁰ -15	220/240 ⁺¹⁰ -15	220/240 ⁺¹⁰ -15
Częstotliwość sieci [Hz]	50	50±1	50±1	50±1	50±1	50±1
Pobór mocy [KA]	1,5	2,0	2,0	2,0	1,6	2,5
Ciepota [kg]	450	.	400	.	.	550
Wymiary [mm]	1800 x 900 x 700	750 x 750 x 1000	90 x 670 x 1745	1800 x 750 x 700	1700 x 700 x 700	600 x 600 x 600

Table 2 Classification of USDC drum memories.

1- USDC designation, 2- avg. access time, 3- capacity (MB), 4 - max. transfer rate, 5- above.
6-less

TABELA 2. Klasyfikacja pamięci bębnowych JS HMO

Oznaczenie w JS HMO	Średni czas dostępu (ms)				Pojemność pamięci (MB)				Max szybkość przenoszenia informacji (kB/s)			
	0-5	6-20	21-50	powyżej 50	poniżej 5	6-50	51-100	powyżej 100	poniżej 50	50-250	250-500	powyżej 500
EC-5033		x				x						x
EC-5035		x			x				x			

Table 3. Technical data of USDC drum memories.

Country	USSR	Poland
USDC designation	EC-5033	EC-5035
DrumControl Unit USDC designation	EC-5533	EC-5551
Max. no. of drums to the controller	up to 8	up to 8
Recording mode	frequency	NRZ
No. of tracks	800	460
No. of aux. tracks	2	40 + 3 + 9
No. of bits per track	--	34,000
Capacity (Mbytes)	6	2
Avg. access time (ms)	-	20
Max. data rate kB/sec	1200	100
Avg. drum rotation time (ms)	22	41
Recording density (b/mm)	36	33
Recording frequency (MHz)	1.25	0.4
Drum rpm	1500	1500
Power Supply (V)	220/380 ± 10	220/380 ± 10
Line frequency (Hz)	50 ± 1	50 ± 1
Power consumption (VA)	1700	1500

Country	USSR	Poland
Weight (kg)	500	400
Length (mm)	1200	1200
Height	750	700
Width	1600	1600
working temperature (°C)	5-40	5-35
Humidity (%)	-	30-80
Error rate	9×10^{-10}	10^{-10}

Table 4. Technical data of USDC disc units with removeable media.

1- country, 2- USSR, 3- Bulgaria, 4- E. Germany, 5-USDC disc designation, 6- USDC controller designation, 7- max. no. of discs per controller, 8- recording method, 9- no. of discs in packet, 10- no. of surfaces in packet, 11- no. of tracks on surface, 12- no. of bytes per track, 13- no. of bytes per cylinder, 14- capacity (MB), 15- avg. cylinder access time, 16 - avg. access time (ms), 17 - max. data transfer rate (Kb/sec), 18- recording density on G00 track (b/mm), 19 - recording density on 202 track (b/mm), 20- power supply (V), 21- line frequency (Hz), 22- Power consumption, 23 - weight, 24- length (mm), 25- height (mm), 26- width (mm), 27- operating temperature (°C), 28- humidity (%), 29- error rate, 30- time for pack change, 31- disc rotation (rpm). 32-Czechoslovakia 33- serial with DF

Kraj produkcyjny ①	② ZSRR	③ LRB	④ ZSRR	⑤ NRD	⑥ CSRS	⑦ ZSRR LRB ¹⁾
Pamięć dyskowa — oznaczenie w JB EMC ⑤	EC-5050	EC-5052	EC-5056	EC-5055	EC-5058	EC-5051
Jednostki sterujące współpracujące z dyskami — oznaczenie w JB EMC ⑥	EC-5551	EC-5552 EC-5553 EC-5554	EC-5551	EC-5555	EC-5556 EC-5557 EC-5558	.
Max. liczba dysków mogących współpracować z jednostką sterującą (sztuki) ⑦	do 8	do 8	do 8	do 8	do 8	.
Sposób zapisu ⑧	asynch. z DF	asynch. z DF	asynch. z DF	asynch. z DF	asynch. z DF	asynch. z DF
Liczba dysków w pakiecie (sztuki) ⑨	6	6	6	6	6	11
Liczba powierzchni pracujących w pakiecie ⑩	10	10	10	10	10	20
Liczba ścieżek na każdej powierzchni dysku ⑪	200+3 zap	200+3 zap	200+3 zap	200+3 zap	200+3 zap	200+3 zap
Długość informacji na ścieżce (bajty) ⑫	.	.	3625	3625	.	.
Długość informacji w cylindrze (bajty) ⑬	.	.	36200	36200	.	.
Pojemność pamięci (Mbaity) ⑭	7,25	7,25	7,25	7,25	7,25	200
Średni czas dostępu do cylindra (ms) ⑮	75	60	75	80	90	50
Średni czas dostępu do informacji (ms) ⑯	90	75	87	.	100	.
Max. ilość przekazywanych informacji (Kbajty/s) ⑰	156	156	156	156	156	2500
Gęstość zapisu na ścieżce Nr 000 (bit/mm) ⑱	.	30	30	.	.	60
Gęstość zapisu na ścieżce Nr 202 (bit/mm) ⑲	.	44	44	.	.	90
Napięcie sieci (V) ⑳	380/220 +10 -15	380/220 +10 -15	380/220 +10 -15	380/220 +10 -15	380/220 +10 -15	380/220 +10 -15
Ciężkość sieci Hz ㉑	50±1	50±1	50±1	50±1	50±1	50±1
Pobór prądu lub mocy ㉒	<1 kA	.	1,5 kA	1,65 kA	1 kA	1,5 A
Objętość (kg) ㉓	.	167	300	270	200	160
Długość (mm) ㉔	800	772	900	1050	800	610
Wysokość (mm) ㉕	890	975	1050	1105	1000	975
Szerokość (mm) ㉖	638	610	780	610	800	775
Temperatura pracy (°C) ㉗	.	15-35	.	15-35	15-35	15-35
Wilgotność powietrza (%) ㉘	.	40-80	.	40-80	40-80	40-80
Stopień błędów ㉙	.	.	10-10	10-10	.	.
Czas wymiany pakietu (min) ㉚	1	1,5	1	1,5	1	.
Prędkość obrotów dysku (ob/min) ㉛	2100	2400±2%	2400	2400±2%	2400±2%	2400±2%

1) Przytoczone w kolumnie dane techniczne odnoszą się do pamięci dyskowej produkcji LRB

Table 5. Characteristics of fixed discs in USOC

Country	USSR	Hungary
Disc unit - USOC designation	EC-5051	EC-5060
Disc controller USOC designation	EC-5551	--
Max. n. of discs per controller	up to 8	--
Recording method	--	serial DF
Avg. access time (ms)	250	10
Nominal data transfer rate		
for 6 heads (Kb/sec)	--	225
Nominal data transfer rate for		
16 heads (Kb/s)	--	169
Max. data rate	63.3	150.0
Track data capacity (bits)	--	27,000
Track data capacity at half disc cap.	--	36,000
Total capacity	100 Mb	7 Mb
Operating temperature		0 - 50
Power supply	380/220V +10% -15%	110, 120, 220, 240V
Line frequency (Hz)	50 ± 1	50/60 ± 1
Power consumption	1.5 Kw	2 A at 220V
Error rate	7×10^{-10}	10^{-10}
Velocity (rpm)	900	6,000
Dimensions (mm)	--	1200 x 950 x 1630

Table 6. Characteristics of USDC card readers.

1- country, 2-USSR, 3- Czechoslovakia, 4- USDC designation, 5- manufacturers code, 6-parameter, 7- channel connection, 8- standard I/O interface, 9- adapter, 10- card feed, 11- synchronous, 12- mechanical, 13- readout, 14- photoelectric, columns, 15- reading rate (cards/m), 16- hopper capacity, 17- feeding, 18- receiving, 19- card type, 20- columns, 21- binary readout only, 22- card code, 23- output code, 24- components, 25- IC's, 26- discrete elements, 27- power supply, 28- power consumption, 29- dimensions (mm).

TABELA 6. Charakterystyka techniczna czytników kart papierowych JS EMO

Parametry i cechy (6)	Kraj producenta (1)		
	ZSRR (2)		Czechos
	Oznaczenia w JS EMO (4)		
	EC-0012	EC-0013	EC-0016
	Oznaczenia wytwórcy (5)		
			ARITMA 1114
Sposób podłączenia do kanału (7)	standardowy interfejs (8)	standardowy interfejs (8)	przez jednostkę dopasowującą (9)
Sposób podania kart (10)	we - wy	we - wy	mechaniczny (13)
Sposób czytania (13)	synchroniczny za pomocą róty	synchroniczny za pomocą róty	fotoelektryczny, kolumnami (14)
Prędkość czytania [karty/min.] (15)	fotoelektryczny, kolumnami (14)	fotoelektryczny, kolumnami (14)	fotoelektryczny, kolumnami (14)
Pojemność zasobników (16)	500	1 000	1 000
podającego (17)	1 000 kart	2 000 kart	2 000 kart
odbierającego (18)	1 000 kart	2 000 kart	2 500 kart
Typ kart (19)	45 i 80 kolumnowe (20)	45 i 80 kolumnowe (20)	80 i 90 kolumnowe (odczyt tylko binarny) (21)
Kod przedstawienia informacji na kartach (22)	KPK - 12	KPK - 13	KPK - 13
Kod informacji na wyjściu urządzenia (23)	DKOI	DKOI	DKOI
baza elementowa (24)	układy scalone i elementy półprzewodnikowe (25, 26)	układy scalone i elementy półprzewodnikowe (25, 26)	układy scalone (25)
Zasilanie (27)	380/220V +10% 50±1Hz -15%	380/220V +10% 50±1Hz -15%	380/220V +10% 50±1Hz -15%
Pobór mocy [KVA] (28)	1	1,5	0,75
Wymiary [mm] (29)	1200 x 500 x 1220	1200 x 750 x 1100	815 x 561 x 1248

Table 7. Characteristics of USDC card punches

1- country, 2-USSR, 3- Czechoslovakia, 4- USDC designation, 5- manufacturer's code, 6- parameters, 7- channel connection, 8- standard I/O interface, 9- punching speed, 10- for 80 columns, 11- number and capacity of feed card hopper, 12- no. and capacity of receiving card hoppers, 13- punched card code, 14- input code, 15- checking, 16- read and comparison, 17- punch echo comparison, 18- card type, 19- 80 columns, 12 lines, 20- card fill coefficient, 21- power supply, 22- power consumption, 23- dimensions.

TABELA 2. Charakterystyka techniczna dzurkarek kart papierowych JS EMC

Parametry i cechy ⑥	Kraj produkujący ①			
	ZSRR ②		CSRS ③	
	Oznaczenie w JS EMC ④			
	EC-7010	EC-7012	EC-7013	EC-7014
	Oznaczenie wytwórcy ⑤			
			ARITMA 1212	
Sposób podłączenia do kanału ⑦	standardowy interfejs wejścia — wyjścia ⑧	standardowy interfejs wejścia — wyjścia ⑧		
Prędkość dziurkowania [kart/min.] ⑨	100	250	250*)	50—117 przy dziurkowaniu 80 kolumna**) ⑩
Liczba i pojemność pojemników podających [kart] ⑪	1×700	1×1200	1×1500	1×1500
Liczba i pojemność pojemników odbierających [kart] ⑫	2 po 700	2 po 1200	2 po 1500	2 po 1400
Kod przedstawienia informacji na kartach ⑬	KPK-12	KPK-12	KPK-12	KPK-12
Kod informacji na wejściu urządzenia ⑭	DKO I	DKO I	DKO I	DKO I
Kontrola ⑮	przez porównanie i porównanie ⑯	przez porównanie informacji z bloku dającego echo przy dziurkowaniu z informacją w pamięci buforowej ⑰	przez porównanie informacji z czytnika kontrolnego z informacją w pamięci buforowej ⑯	przez porównanie informacji z czytnika kontrolnego z informacją w pamięci buforowej ⑯
Rodzaj kart ⑱	80 kolumnowe, 12 pozycyjne ⑲	80 kolumnowe, 12 pozycyjne ⑲	80 kolumnowe	80 kolumnowe
Współczynnik opóźnienia karty ⑳	do 0,7	do 0,7		
Napięcie ㉑	200/230V +10% -15%; 50Hz±3%	200/230V +10% -15%; 50Hz±3%		3×300V
Pobór mocy [kVA] ㉒	≤1	≤3		0,8
Wymiary [mm] ㉓	1385×550×1255	1350×550×1270	950×900×1301	1250×485×1154 ㉔

Table 8. Characteristics of USDC paper tape controller

1- country, 2- Hungary, 3- Poland, 4- USSR, 5- USDC designation, 6- manufacturer's designation, 7- parameter, 8- channel connection, 9- standard I/O interface, 10-reading speed, 11- continuous, 12- start stop, 13- reading method, 14- photoelectric, 15- no. of tracks, 16- punched code, 17- on input with conversion or arbitrary while copying, 18- output code, 19- USDC code, 20- check principle, 21- reading check, 22- reading and conversion, 23- buffer memory, 24- yes, 25- no, 26- components, 27- IC's and discrete, 28-power supply, 29- power consumption, 30- dimension, 31- weight.

Parametry i cechy 7	Kraj produkujący ①		
	WRL ②	PRL 3	4 ZSRB
	Oznaczenia w JS EMC 5		
	EC-0022	EC-0022	EC-0022
	Oznaczenie wytwórcy 6		
	ERCU-1		
Sposób podłączenia do kanału 8	standardowy interfejs we - wy 9	standardowy interfejs we - wy 9	standardowy interfejs we - wy 9
Szybkość czytania: — praca ciągła (znak/s) 11 — praca start-stopowa (znak/s) 12	1500 0-1000	2000 do 2000	1500 do 1500
Metoda odczytu 13	fotoelektryczna 14	fotoelektryczna 14	fotoelektryczna 14
Liczba czytanych ścieżek 15	5, 6, 7 lub 8	5 i 8	5, 6, 7, 8
Kod informacji przedstawiony na taśmie papierowej 16	ISO-7, ISO-8	.	KOI-7 przy wejściu z przekształcaniem informacji lub dowolny kod w trybie kopiowania 17
Kod informacji na wyjściu urządzenia 18	ISO-8 lub kod JS EMC 19	.	KOI-8 przy wprowadzaniu z przekształcaniem lub dowolny kod w trybie kopiowania 17
Zasada kontroli 20	Kontrola układu czytania 21	Kontrola układu czytania 21	Kontrola układu czytania i przekształcania kodu 22
Obecność buforowego bloku pamięci 23	jest 24	.	brak 25
Skład elementowa 26	.	.	Układy scalone i elementy dyskretnie 27
Zasilanie 28	220V $\pm 10\%$ -10 50Hz $\pm 2\%$	220V $\pm 10\%$ -15 50Hz $\pm 2\%$	380/220V $\pm 10\%$ -15% 50Hz $\pm 2\%$
Pobór mocy [VA] 29	400, z przystawkami 1000	300	800
Wymiary [mm] 30	1200 x 620 x 1000	.	1200 x 500 x 1100
Ciepota [kg] 31	120	.	100

Table 9. Characteristics of USDC paper tape punch controller

Parameter	Country	
	USSR	Poland
	USDC EC-7022	Designation EC-7024
Channel connection	std. I/O interface	std. I/O interface
Tracks	5, 8	5, 8
Punching speed, start stop (ch/s)	150	110
Tape code	KOT-7 with conversion; any while copying	
Input code	KOT-8 with conversion; any while copying	
Check method	parity and legal combination	
buffer memory components	9-bit register	
	IC's and discrete	IC's
Power supply	220/38 V $\pm 10\%$	220V $\pm 10\%$
	50 Hz ± 1 Hz	50 Hz ± 1 Hz
Power consumption VA	800	
Dimension (mm)	1200 x 500 x 1190	
Weight	100 kg.	

Table 10. Characteristics of Paper Tape Unit

1- country, 2-Czech. 3- E. Germany, 4- parameter, 5- USDC designation, 6- channel connection, 7- std. I/O interface, 8- tracks, 9- input code, 10- arbitrary, 11- check base, 12- control bit, 13- operation mode, 14- start-stop, 15- buffer memory, 16- yes, 17- no. of readers, 18- maximum reading speed, 19- no. of punching mechanisms, 20- max. punching rate, 21- power supply, 22- power consumption, 23- basic configuration - 1 reader, 1 punch, 24- expanded configuration; 2 readers, 1 punch, 25- dimensions, 26- basic conf., 27- extended conf., 28- weight, 29- components, 30- IC's.

Parametr 4	Kraj 1	
	CSRS 2	NED 3
	Oznaczenia w JS RMO 5	
	BO-7002	BO-7008
Sposób podłączenia do kanału 6	.	7 standardowy interfejs wej-wy
Ilość ścieżek 8	5,6,7,8	5,6,7,8
Kod informacji na wejście urządzenia 9	.	dowolny 10
Składowa kontrola 11	14	na pomoc bitu kontrolnego 12
Reżim pracy 13	start-stopowy	start-stopowy 14
Buforowy blok pamięci 15	.	tak 16
Urządzenie wyprowadzenia z taśmy — max. ilość 17 — max. szybkość czytania [m/s] 18	1 1000	2 1000
Urządzenie wyprowadzenia na taśmę 19 — max. ilość — max. szybkość dotryskiwania [m/s] 20	1 100	1 100
Katizacja 21	.	230; 60Hz ± 1Hz
Pożer mocy 22 — podstawowy zestaw 1 czytnik, 1 perforator [VA] — rozszerzony zestaw 2 czytniki, 1 perforator [kVA]	.	600 1000
Wymiary: zestaw podstawowy [mm] zestaw rozszerzony [mm]	1400 × 610 × × 1532 .	1500 × 600 × 600 2300 × 600 × 600
ciężar: zestaw podstawowy [kg] zestaw rozszerzony [kg]	.	250 330
Składowe elementy 29	.	układy scalone

Table 11. Characteristics of USOC paper tape readers.

1- country, 2- Hungary, 3- Poland, 4- Czechoslovakia, 5- USOC designation, 6- manufacturer's designation, 7- parameters, 8- channel connection, 9- std. I/O interface, 10- operation mode, 11- reading method, 12- photoelectric, 13- reading rate, in start-stop, 14- continuous reading rate, 15- tracks, 16- power supply, 17- power consumption, 18- dimensions, 19-weight, 20 operating temperature, 21- humidity, 22- mean time between failures, 23 information rate between failure, 24- error rate, 25- availability.

TABELA 11. Charakterystyka techniczna czytników (taśmy papierowej) JS EMC

Parametry i cochy 7	Kraj produkcyjny 1				
	WRL 2	PRL 3	WRL 2	PRL 3	CSRS 4
	Oznaczenie w JS EMC 5				
	EC-6121	EC-6121	EC-6122	EC-6122	EC-6122
	Oznaczenie wytwórcy 6				
	ER-300	.	ER-1500	.	YS-1500
8	standardowy interfejs we - wy 9	standardowy interfejs we - wy 9	standardowy interfejs we - wy 9	standardowy interfejs we - wy 9	
10	start - stop	start - stop	start - stop	start - stop	start - stop
11	fotoelektryczny 12	fotoelektryczny 12	fotoelektryczny 12	fotoelektryczny 12	fotoelektryczny 12
13	0-150 albo 0-300 (wiersze/s)	150 albo 300	0-1000	2000 albo 1000	
14	>275 albo 150		>1500		1500 +10% -15%
15	5, 6, 7 albo 8	5 albo 8	5, 6, 7 albo 8	5 albo 8	5 albo 8
16	220V +10% -15%; 50Hz ± 2%	220V +10% -15%; 50Hz ± 2%	220V +10% -15%; 50Hz ± 2%	220V +10% -15%; 50Hz ± 2%	220V +10% -15%; 50Hz ± 2%
17	≤0,15	0,2	≤0,25	0,2	≤0,2
18	470 x 240 x 220	340 x 240 x 175	455 x 300 x 225	340 x 240 x 175	430 x 225 x 225
19	24	15	25	15	15
20	+5 - +40	+10 - +35	+5 - +35	+10 - +35	
21	40-80	40-80	40-80	40-80	
22	>400	500	500	500	500
23	2,5 . 10 ⁴		7,5 . 10 ⁴		7,5 . 10 ⁴
24	10 ⁻⁷	10 ⁻⁷	5 . 10 ⁻⁷	10 ⁻⁷	5 . 10 ⁻⁷
25	0,975		0,975		0,975

Table 12. Paper Tape and edge punched card reader (mechanism)

1- country, 2- Hungary, 3- Czechoslovakia, 4- USSR, 5- USDC designation, 6- manufacturer's code, 7- parameters, 8- reading speed for start-stop mode, 9- continuous reading speed, 10- operating modes, 11- continuous, 12- direction, 13- bidirectional, 14- possibility of rereading, 15- tracks, 16- reading mechanism, 17- photoelectric, 18- tape width, 19- card width, 20- information code, 21- arbitrary, 22- components, 23- IC's, 24- power, 25- power consumption, 26- operating temperature, 27- humidity, 28- mean time between failures, 29- volume of data between failures, 30- error rate. 31- 80 column cards.

TABELA 12. Urządzenia wczytywania informacji z taśmy papierowej i kart obrzeźnie dziurkowanych JS EMC (mechanizmy)

Parametry i cechy 7	Kraj produkujący 1		
	WRL 2	CSRS 3	4 ZSRB
	Oznaczenie w JS EMC 5		
	EW 6101	EC-6101	EC-6111
	Oznaczenie wytwórcy 6		
	ER-40	.	.
Prędkość czytania w reżimie start-stopowym 8	max 10 wierszy/s <i>ch/s</i>	40-100 wierszy/s - taśmą 40-50 wierszy/s z kart <i>ch/s</i>	50 kolumn/s
Prędkość czytania w reżimie ciągłym (znak/s) 9	max 150	300	.
Reżimy pracy 10	start - stopowy - ciągły 11	start - stopowy	start - stopowy
Przebieg taśmy 12	w obu kierunkach 13	w obu kierunkach 13	istnieje możliwość powtórzonego czytania karty 14
Liczba ścieżek 15	5, 6, 7 albo 8	5, 6, 7	.
Sposób czytania 16	fotoelektryczny 17	.	fotoelektryczny 17
Szerokość taśmy papierowej [mm] 18	17,4; 25,4	.	.
Szerokość karty [mm] 19	76,2; 82,6	76,2	karty 80 kolumnowe 31
Sposób przedstawienia informacji 20	dowolny 21	.	dowolny 21
Składowe elementy 22	układy scalone 23	.	.
Zasilanie 24	220V +10% -15%; 50Hz ± 3%	12V +0,6V -0,3V; 5-24V	200/220V +10% -15%; 50Hz ± 3%
Pobór mocy [W] 25	50	.	60
Wymiary [mm] 26	150 × 200 × 100	.	270 × 270 × 110
Ciepota [kg] 27	2,1	.	.
Temperatura pracy [°C] 28	+5 - +40	.	.
Wilgotność [%] 29	25-80	.	.
Średni czas między uszkodzeniami [godz.] 30	450	.	.
Średnia liczba przetwarzanych znaków między uszkodzeniami 31	2,7 · 10 ⁶	.	.
Stopa błędów 32	10 ⁻⁴	.	.

Table 13. Paper Tape and Edge punched Cards Output Mechanisms

Parameters	Country	
	Hungary	Czechoslovakia
	USDC	designation
	EC-7191	EC-7192
	Manufacturer's code	
	EP 35	
Punch code	33 lines/s	50 ch/s
Operating mode	start-stop, bidirectional	
Tracks	5,6,7,8	5,6,7,6
Tape width	17.5; 25.4	
Card width	76.2, 82.6	76.2
Reverse feed check	manual & auto on request during punch	
		yes
Power supply	220V ^{+10%} -15% 50 Hz	12V ^{+0.5} -0.2 2.5A 220V ^{+10%} -15%
Power consumption	70	120
dimensions	240 x 228 x 150	270 x 200 x 217
weight	6.5	
Size of the Sheet with edge perforation	195 x 210	

Table 14. Characteristics of USDC XY plotters

1- country, 2- USSR, 3- Czechoslovakia, 4- USDC designation,
5- manufacturer's designation, 6- parameters, 7- type, 8- drum,
9- table, 10- channel connection, 11- standard I/O interface, 12- control system, 13- unit pen travel, 14- maximum speed, 15- simultaneous XY motion, 16- yes, 17- paper size, 18- working area, 19- no. of colors, 20- means of color change, 21- automatic, 22- line width, 23- no. of symbols, 24- orientation of characters, 25- horizontal and vertical, 26- 16 positions every 22.5°, 27- input code, 28- serial parallel, 29- 9 rows binary, 30- 150- 96 characters own 5 track code, 31- type of line, 32- continuous, 33- points, segment-points, 34- power supply, 35- power consumption, 36- dimensions, 37- plotter, 38- controller, 39- encoder, 40- programmed, 41- scale of symbols

13
14
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34
35

Parametry i cechy 6	Kraj produkujący 1			
	ZSRR 2		ČSR 3	
	Oznaczenie w JB ENG 4			
	EC-7062	EC-7063	EC-7061	EC-7064
	Oznaczenie wytwórcy 5			
			DIGIGRAF 1612	
Typ 7	bębnowy 8	bębnowy 8	ze stołem 9	ze stołem 9
Sposób podłączenia do kanału 10	standardowy interfejs wejścia — wyjścia 11	standardowy interfejs wejścia — wyjścia 11	standardowy interfejs wejścia — wyjścia 11	przez urządzenie sterujące 12
Elementarny przestaw pisania (mm)	0,1 i 0,05	0,1 i 0,05	0,05 albo 0,025	0,05
Maksymalna prędkość (mm/s)	200	150	50	50
Możliwość jednoczesnego ruchu w kierunku rządowych i odciętych	jest 16	jest 16	.	.
Format papieru (mm)	420 × 80000	575 × 20000	1200 × 1150	1750 × 1370
Wymiary obszaru roboczego	380 × 600	641 × 1000 albo 730 × 1000	1050 × 1050	1000 × 1200
Liczba możliwych kolorów pisania	3	3	3	4
Sposób zmiany koloru	automatyczny 24	automatyczny 24	automatyczny 24	programowy 40
Szerokość linii zapisu (mm)	0,3; 0,5; 0,8	0,3; 0,5; 0,8	0,3; 0,5; 0,8	0,1—1,2
Liczba krótkowych symboli	64	do 253	do 253	64
Skala kreślenia symboli	1:2, 1:1, 2:1	1:2, 1:1, 2:1	1:2, 1:1, 2:1	1:2, 1:1, 2:1
Orientacja krótkowych znaków 24	pozioma i pionowa 25	16 pozycji co 22,5° 26	16 w pozycji co 22,5° 26	16 pozycji co 22,5° 26
Kod informacji na wejściu urządzenia	szeregowo-równoległy 28 9-rzutowy, binarny 29	szeregowo-równoległy 28	szeregowo-równoległy 28	130-80 znaków, własny kod 8-cio-bitowy 30
Typ kreślenia linii	ciągły 32	ciągły, punktowy, krakowo-punktowy 33	ciągły, punktowy, krakowo-punktowy 33	ciągły, krakowo-punktowy 33
Zasilanie	300/220V +10% -15%; 50Hz ± 2%	300/220V +10% -15%; 50Hz ± 2%	300/220V +10% -15%; 50Hz ± 3%	3 × 300V/220V; 50Hz
Potwór mocy [kVA]	1,2	1,5	2	1,7
Wymiary: [mm] 36	600 × 1200 × 1370 (całokt)	665 × 425 × 315 500 × 1200 × 1050 500 × 1200 × 1050	1710 × 1640 × 970 500 × 1200 × 1050 500 × 1200 × 1050	2420 × 1630 × 1710 720 × 705 × 1000
— urządzenie pisanie 37				
— blok sterowania 38				
— blok przekodowania 39				

Table 15. Characteristics of USOC line printers

1- country, 2- USSR, 3- E. Germany, 4- Poland, 5- Czechoslovakia,
6- USOC designation, 7- manufacturer's designation, 8- parameters,
9- channel connection, 10- standard I/O interface, 11- adapter system,
12- information check, 13- internal, 14- parity, 15- paper feed,
16- asynchronous, 17- paper feed time, 18- first line, 19- next line,
20- line feed control, 21- 4 track tape, 22- program or paper tape,
23- no. of paper tracks, 24- printing speed, single space (lpm) ,
25- printing speed, numeric only (lpm), 26- character set, 27- no. of
characters/line, 28- line separation, 29- character separation, 30-
input code, 31- paper width, 32- no. of copies, 33- memory buffer,
34- one line capacity, 35- components, 36- IC's, 37- power supply,
38- power consumption, 39- dimensions, 40- weight.

TABELA 15. Charakterystyka techniczna drukarek wielorownych JS RMC

Lp.	Parametry i cechy	Kraj producenta						
		ZARR 2	NED 3	ZARR 2	PRL 4	CSRS 5	NED 3	CSRS 5
		Oznaczenia w JS RMC						6
		EC-7030	EC-7031	PC-7032	EC-7033	EC-7034	EC-7035	EC-7036
		Oznaczenia wytwórcy						7
		Scimitron 478		DW 8		Scimitron 478		
1	Sposób przyłączenia do kanału 9	standardowy interfejs we-wy 10	standardowy interfejs we-wy 10	standardowy interfejs we-wy 10	standardowy interfejs we-wy 10	standardowy interfejs we-wy 10	standardowy interfejs we-wy 10	11 przez wbudowany w urządzenie blok połączenia z kanałem
2	Kontrola przesłanej informacji 12	układowa, 13 sprawdzane 14 parzystości		układowa 13	układowa 13			
3	Sposób podawania papieru	asynchroniczny	asynchroniczny	asynchroniczny	asynchroniczny	asynchroniczny	asynchroniczny	asynchroniczny
4	Czas przesuwu papieru: — pierwszego wiersza (ms) — każdego następnego wiersza (ms) 17 19	18 10	20,7 6	16 10	16 12,5 4,08 lub 5,30	16 26 7,8	16 20,7 8	16 20 7,8
5	Sterowanie wysuwaniem papieru 20	sterowanie taśmą 4-ro ścieżkową 21	programowe lub taśmą papierową 22	taśmą papierową 4-ro ścieżkową 21	programowe lub taśmą papierową 22	taśmą papierową 12 ścieżkową 21		
6	Liczba traktów papieru 23	1	1 lub 2	1	1	1	1	1 lub 2
7	Szybkość druku pełnego zestawu znaków przy pojedynczym odstępie między wierszami (wierszy/min)	650—800	900	900	600 lub 1100	600—800	600	750—1000
8	Szybkość druku znaków cyfr przy pojedynczym odstępie między wierszami (wierszy/min)		1800				1500	
9	Repertuar znaków		63		96	64	63	
10	Liczba znaków w wierszu	128	156	128	128 lub 160	128	128	
11	Odstęgi między wierszami		4,23		4,23 lub 3,17		4,23	
12	Odstęgi między znakami w wierszu (mm)		2,54		2,54		2,54	
13	Kod informacji na wejściu urządzenia		EBCDIC		DKOI	KOI	EBCDIC	
14	Szerokość papieru (mm)	60—420	60—420	60—420	max 448	max 420	60—420	max 450
15	Liczba kopii	2	3	5	5	2—5	3	3—5
16	Obecność buforowego bloku pamięci	pojemność 1 wiersza 34	pojemność 1 wiersza 34	pojemność 1 wiersza 34	pojemność 1 wiersza 34	pojemność 1 wiersza 34	pojemność 1 wiersza 34	pojemność 1 wiersza 34
17	Baza elementowa	układy scalone 36	układy scalone DTL 36	układy scalone 36	układy scalone 36	układy scalone 36	układy scalone 36	układy scalone 36
18	Zasilanie	220V/300V +10% -15% 50±1Hz	220V/300V +10% -15% 50±1Hz	220V/300V +10% -15% 50±1Hz	220V/300V +10% -15% 50±1Hz	220V/300V +10% -15% 50±1Hz	220V/300V +10% -15% 50±1Hz	220V/300V +10% -15% 50±1Hz
19	Pobór mocy (kVA)	1,5	2	2	3,5		2	
20	Wymiary (mm)	1820×680× ×1425	2770×670× ×1261	1800×680× ×1270	1850×680× ×1270	1370×780× ×1400	2770×670× ×1261	1500×780× ×1400
21	Ciepota (kg)		750		700		750	

Table 16. Characteristics of USDC keyboards

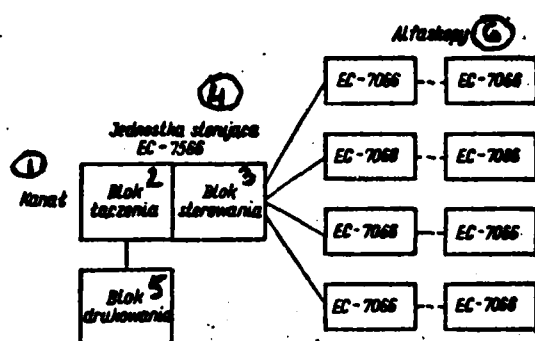
1- country, 2- Czechoslovakia, 3- Hungary, 4- USDC designation,
5- parameters, 6- switching method, 7- contact less, 8- power supply,
9- current requirements, 10-output, 11- TTL logic level, 12- information
output, 13- 7 bits, 14- information check, 15- parity, 16- minimum
character number, 17- no. of keys, 18- speed, 19- code, 20- USDC
compatible, 21- key roll off protection, 22- electronic.

TABELA 16. Charakterystyka techniczna klawiatur znakowych JS EMC

Parametry i cechy 5	Kraj produkujący 1		
	CSRS 2	WRL 3	WRL 3
	Oznaczenie w JS EMC 4		
	EC-0101	EC-0101	EC-0102
System przełączania 6	bezstykowy 7	bezstykowy 7	bezstykowy 7
Napięcie zasilania [V] 8	+5	+5	+5
Potrzebne natężenie prądu [A] 9		max. 0,6	0,1
Wyjście 10	logiczne poziomy układów TTL 11	logiczne poziomy układów TTL 11	logiczne poziomy układów TTL 11
Wyjście informacyjne 12	7 bitowe 13	7 bitowe 13	
Kontrola informacji 14	bit parzystości lub nieparzystości 15	bit nieparzystości 15	
Minimalna liczba znaków 16	96	96	10 (cyfry)
Liczba klawiszy 17	74	78	10
Średnia robocza [zm/s] 18	15 20	15 20	do 25
Kod 19	zgodny z wymaganiami JS EMC	zgodny z wymaganiami JS EMC	
Metoda przy jednoczesnym naciskaniu więcej niż 1. klawisza 21	elektroniczna 22	elektroniczna 22	

Fig 4. Block diagram of EC-7906 character display

1- channel, 2- connecting system, 3- controller, 4- control unit
EC-7566, 5- printing system, 6- character display.



Rys. 4. Schemat blokowy systemu alfaskopów EC-7906

Table 17. Characteristics of USDC typewriter controllers.

1- country, 2- USSR, 3- Czechoslovakia, 4- E. Germany, 5- Bulgaria,
6- USDC designation, 7- parameters, 8- channel connection, 9- std.
I/O interface, 10- additional controllers and indicators, 11- yes,
12- typewriter, 13- no. of characters, 14- typing speed, 15- paper
width, 16- max. no. of copies, 17- carriage width, 18- input code,
19- output code, 20- power supply, 21- power consumption, 22- dimensions
(including table height), 23- weight.

TABELA 17. Charakterystyka techniczna jednostek sterujących elektrycznymi maszynami do pisania JS EMC

Parametry i cechy 7	Kraj produkujący			
	ZSRR 2	CSRS 3	NRD 4	RLB 5
	Oznaczenia w JS EMC 6			
	EO-7070	EO-7071	EO-7073	EO-7074
Sposób przyłączenia do kanału 8	standardowy interfejs 9 we - wy	.	standardowy interfejs 9 we - wy	standardowy interfejs 9 we - wy
Dodatkowe elementy sterowania i wskaźniki 10	posiada 11	posiada 11	posiada 11	posiada 11
Maszyna do pisania 12				
— ilość symboli 13	93	92	92	93
— szybkość pisania [zn/s] 14	do 10	10	10	10
— szerokość papieru [mm] 15	280	310	297	
— max. ilość kopii 16	5	4	5	5
— szerokość karetki [mm] 17			320	280-320
Kod informacji na wejściu urządzenia 18	.	SKOI	.	.
Kod informacji na wyjściu urządzenia 19	.	KDOI	.	.
Zasilanie 20	220V +10% -15% 50Hz±1Hz	220V +10% -15% 50Hz±1Hz	.	220V +10% -15% 50Hz±1Hz
Pobór mocy [VA] 21	200	600	250	500
Wymiary [mm] 22	1000×620×900	1200×600×700	2070×690×900 730	1200×700×1100
W tym wysokość stołu [mm]				
Ciężar [kg] 23	.	.	190	.

Table 18. Characteristics of USDC typewriters.

1- country, 2- Czechoslovakia, 3- E. Germany, 4- Bulgaria, 5- USDC designation, 6- manufacturer's designation, 7- typing speed, 8- no. of copies, 9- no. of keys, 10- character size, 11- no. of printed characters, 12- max. no. of characters/ line, 13- line distance, 14- reel width, 15- power supply, 16- power consumption, 17- dimensions, 18- weight, 19- character separation, 20- spacing, 21- lines, 22- ribbon width.

TABLICA 18. Charakterystyka techniczna elektrycznych maszyn do pisania JS EMC

Parametry i cechy 7	Kraj produkujący 1		
	CSRS 2	NRD 3	LBR 4
	Oznaczenia w JS EMC 5		
	EO-7172	EO-7173	EO-7174
	Oznaczenia wytwórcy 6		
	CONSUL 264.8	SOEMTRON 889	MARICA 141
Prędkość pisania (zn/s) 7	10	9,5	10
Ilość kopii 8	3	6	6
Ilość klawiszy 9	46	46	46
Rozmiar czcionki (mm) 10	2,5	2,5	2,5
Ilość drukowanych symboli 11	92	92	92
Max. ilość znaków w wierszu 12	108	117	123
Podstawowy odstęp wiersza (mm) 13	4,25	4,25	4,25
Szerokość rolki papieru (mm) 14	200, 215, 234, 250	max. 330	230-330
Zasilanie 15	230V +10% -15%	230V +10% -15%; 50±1Hz	230V +10% -15%; 50±1Hz
Pobór mocy (VA) 16	56	100	50
Wymiary (mm) 17	456 x 540 x 226	616 x 570 x 310	500 x 500 x 450
Ciężar (kg) 18	3,7	3,7	3,3
Odległość między środkami znaków (mm) 19	2,6	2,6	2,6
Przebieg odstępów między wierszami 20	1, 2, 3 wiersze 21	1, 2, 3 wiersze 21	1, 2, 3 wiersze 21
Szerokość taśmy barwniczej (mm) 22	18	18	18

Table 19. Characteristics of USDC character and graphic displays.

1- country, 2- Hungary, 3- USSR, 4- USDC designation, 5- manufacturer's designation, 6- parameters, 7- channel connection, 8- control system, 9- std. I/O interface, 10- through EC-7566 device, 11- through minicomputer, (1010B), 12- no. of characters on screen, 13- no. of symbols, 14- screen size, 15- data rate (KB/s), 16- refresh rate (frame/s), 17- character generation, 18- vector, 19- horizontal, vertical and 45° lines, 20- raster, 21- screen color, 22- green, 23- no. of function keys, 24- power supply, 25- buffer capacity, 26- components, 27- IC's, 28- discrete, 29- power consumption, 30- dimensions, 31- control unit, 32- desk, 33-character size

TABELA 19. Charakterystyka techniczna alfabetyków i grafików JS EMC

Parametry i cechy 6		Kraj produkujący 1			
		WRL 2		ZSRR 3	WRL 2
		Oznaczenie w JS EMC 4			
		EC-7061	EC-7063	EC-7064	EC-7066
		Oznaczenie wytwórcy 5			
		ADV 1000			OD' 71
Sposób przyłączenia do kanału 7		przez blok sterowania i połączenia z kanałem 8	przez blok sterowania i połączenia z kanałem 8	standardowy 9 Interface we — wy	poprzez urządzenie sterujące EC-7566 10 poprzez małą EMC (1010B) 11
Liczba znaków informacyjnych na ekranie 12		1024 albo 960	1024 albo 960	2100	960
Liczba symboli 13		min. 64	96, min. 64	.	128
Wymiary ekranu [mm] (pole robocze) 14		160 × 200	150 × 200	250 × 250	320 × 180
Wymiary znaku [mm] 15		2,4 × 3,6	2,4 × 3,6	.	3,5 × 2,5 albo 7 × 5
Maksymalna prędkość przekazu danych [kB/s] 16		100	100	.	.
Čapstotliwość regeneracji obrazu [kadrow/s] 16		około 60	około 60	60	60
Sposób przedstawienia znaków 17		wektorowy 18	wektorowy 18	.	kreski poziome, pionowe i nachylone pod kątem 45° 19 z linii 20
Kolor ekranu 21		zielony 22	zielony 22	zielony 22	.
Liczba funkcyjnych klawiszy 23		18	22	33	.
Pojemność pamięci buforowej [B] 25		1024	1024	2-4096	.
Ham elementowa 26		układy scalone 27	układy scalone 27	układy scalone i elementy dyskretne 27, 28	układy scalone i elementy dyskretne 27, 28
Zasilanie 24		220V +10% -15%; 50Hz ± 2Hz	220V +10% -15%; 50Hz ± 2Hz	380/220V +10% -15%; 50Hz ± 1Hz	380/220V +10% -15%; 50Hz ± 1Hz
Pobór mocy [VA] 29		320	390	2000	.
Wymiary [mm] 30		420 × 620 × 360	420 × 620 × 360	600 × 600 × 600 1200 × 750 × 1000 1490 × 660 × 700	.
- urządzenie sterujące 31	
- stoła 32	

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